



Please write clearly in block capitals.

Centre number Candidate number

Surname MODEL SOLUTIONS

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

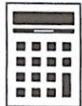
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Foundation Tier Paper 3 Calculator

Tuesday 11 June 2019 Morning Time allowed: 1 hour 30 minutes

Materials

- For this paper you must have:
- a calculator
 - mathematical instruments.



For Examiner's Use	
Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12-13	
14-15	
16-17	
18-19	
20-21	
22-23	
24-25	
26	
TOTAL	

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

In all calculations, show clearly how you work out your answer.



JUN1983003F01

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Answer all questions in the spaces provided

1 Circle the value of the digit 2 in the answer to $5200 \div 10$ [1 mark]

2 20 200 2000

2 Solve $x - 8 = 5$
Circle your answer. [1 mark]

$x = -13$ $x = -3$ $x = 3$ $x = 13$

3 Circle the fraction that is equal to $2\frac{1}{4}$ [1 mark]

$\frac{7}{4}$ $\frac{9}{4}$ $\frac{21}{4}$ $\frac{25}{4}$



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4 Circle the expression which means x divided by y

[1 mark]

$$\left(\frac{x}{y} \right)$$

$$\frac{y}{x}$$

$$\frac{1}{xy}$$

$$\frac{1}{x+y}$$

5 Put these numbers in order from smallest to largest.

[2 marks]

$$\frac{31}{40}$$

$$\frac{3}{4}$$

$$\frac{7}{10}$$

0.725

$$\frac{31}{40} = 0.775$$

$$\frac{3}{4} = 0.75$$

$$\frac{7}{10} = 0.7$$

Smallest

$$\frac{7}{10}$$

$$0.725$$

$$0.75$$

Largest

$$0.775$$

Turn over ►



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- 6 Josh downloads album A.
A has 11 tracks.
Each track on A costs the same.
The total cost of downloading A is £8.80

Josh also downloads album B.
B has 14 tracks.

- 6 (a) Work out the total cost of downloading B.
Assume each track costs the same as a track on A.

[3 marks]

$$\pounds 8.80 \div 11 = \pounds 0.80$$

$$\pounds 0.80 \times 14 = \pounds 11.20$$

Answer \pounds 11.20



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- 6 (b) In fact, compared to the cost of each track on A
the cost of 6 tracks on B is **more** by 5p each
the cost of 8 tracks on B is **less** by 5p each.

What does this tell you about your answer to part (a)?

Tick **one** box.

The total cost is **less** than my answer to part (a)

The total cost is **more** than my answer to part (a)

The total cost is **the same** as my answer to part (a)

Give a reason for your decision.

[2 marks]

The more tracks purchased the less it
costs.

Turn over for the next question


5




Turn over ►



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- 7 The pictogram shows information about the houses in a street.
Each house has 3, 4 or 5 bedrooms.

Key:  represents 2 houses

3-bedroom houses	
4-bedroom houses	
5-bedroom houses	

In total, how many bedrooms do these houses have?

[3 marks]

$$3 \text{ bed} = 9 \text{ houses}$$

$$4 \text{ bed} = 10 \text{ houses}$$

$$5 \text{ bed} = 3 \text{ houses}$$

$$\begin{aligned} \text{Total bedrooms} &= (9 \times 3) + (10 \times 4) + (3 \times 5) \\ &= 82 \end{aligned}$$

Answer 82



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- 8 Four positive whole numbers add up to 84
One of the numbers is a multiple of 17
The other three numbers are equal.

What are the four numbers?

[3 marks]

$$84 - 17 = 67 \text{ (not divisible by 3)}$$

$$84 - 34 = 50 \text{ (not divisible by 3)}$$

$$84 - 51 = 33 \text{ (divisible by 3)}$$

$$33 \div 3 = 11$$

Answer 51 11 11 11

Turn over for the next question

6

Turn over ►



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- 9 Jim wants to buy 10 rolls of wallpaper.
He sees these prices.

Wallpaper	
Single roll	£12.50
Pack of 3 rolls	£34.50
Pack of 5 rolls	£58.75

What is the cheapest price for 10 rolls?

[4 marks]

$$10 \text{ single rolls} = £125$$

$$2 \text{ packs of 5 rolls} = £117.50$$

$$3 \text{ packs of 3} = £103.50$$

$$+ £12.50 = £116$$

Answer £ 116



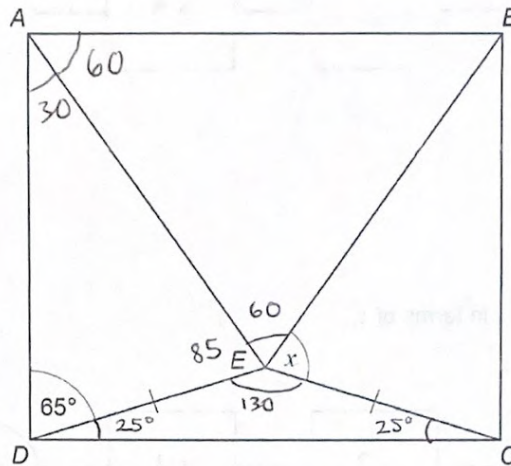
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10

In rectangle $ABCD$

triangle ABE is equilateral

triangle CDE is isosceles, with $CE = DE$



Not drawn accurately

Work out the size of angle x .

[4 marks]

$$\angle EDC = 90^\circ - 65^\circ = 25^\circ$$

$$\triangle EDC \text{ is isosceles so } \angle DEC = 130^\circ$$

$$\triangle ABE \text{ is equilateral, so } \angle AEB = 60^\circ$$

$$\angle DEA = 180^\circ - 30^\circ - 65^\circ = 85^\circ$$

$$x = 360^\circ - 130^\circ - 60^\circ - 85^\circ = 85^\circ$$

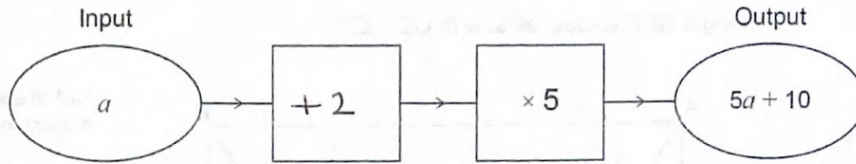
Answer 85 degrees

Turn over ▶



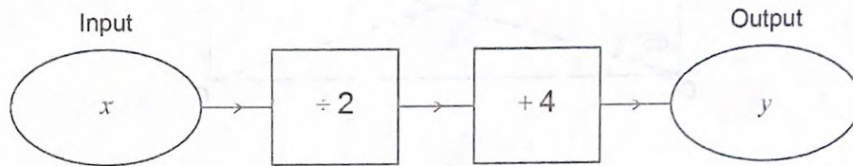
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11 (a) Complete the number machine.



[1 mark]

11 (b) Write down the output y in terms of x .



[1 mark]

Answer $y = \frac{x}{2} + 4$



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12 The first four triangular numbers are 1, 3, 6, 10
Circle the next triangular number.

[1 mark]

14

15

16

19

13 Write down all the prime numbers between 40 and 50

[2 marks]

Answer 41, 43 and 47

Turn over for the next question

5

Turn over ►



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14

In this question use

$$1 \text{ cubic foot} = 6.23 \text{ gallons}$$

$$1 \text{ cubic foot} = 0.028 \text{ cubic metres}$$

Convert 3115 gallons into cubic metres.

[3 marks]

$$3115 \div 6.23 = 500 \text{ cubic feet}$$

$$500 \times 0.028 = 14 \text{ cubic metres.}$$

Answer 14 m³

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15 Circle the correct statement.

[1 mark]

$$\frac{1}{3} \leq 30\%$$

$$\frac{1}{3} = 30\%$$

$$\frac{1}{3} < 30\%$$

$$\frac{1}{3} \neq 30\%$$

16 Which shape **must** have rotational symmetry?
Circle your answer.

[1 mark]

isosceles triangle

trapezium

kite

parallelogram

Turn over for the next question

Turn over ►



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- 17 A shop sells ice creams.
Each ice cream has two scoops.



The possible flavours are vanilla (V), strawberry (S), chocolate (C) and mint (M).
The two scoops can be the same flavour or different flavours.

- 17 (a) List all the possible options for the two scoops.

[2 marks]

VV VS VC VM
SS SC SM
CC CM
MM



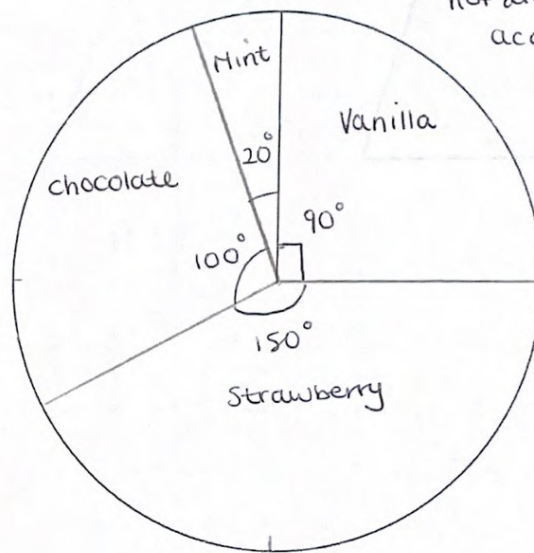
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- 17 (b) In one hour the shop sells 180 scoops of ice cream.
The number of scoops of each flavour is shown in the table.

Flavour	Vanilla	Strawberry	Chocolate	Mint
Number of scoops	45	75	50	10

Complete the pie chart to represent the data.

* angles not drawn accurately [4 marks]



$$\text{Vanilla : } \frac{45}{180} \times 360 = 90^\circ$$

$$\text{Strawberry : } \frac{75}{180} \times 360 = 150^\circ$$

$$\text{Chocolate : } \frac{50}{180} \times 360 = 100^\circ$$

$$\text{Mint : } \frac{10}{180} \times 360 = 20^\circ$$

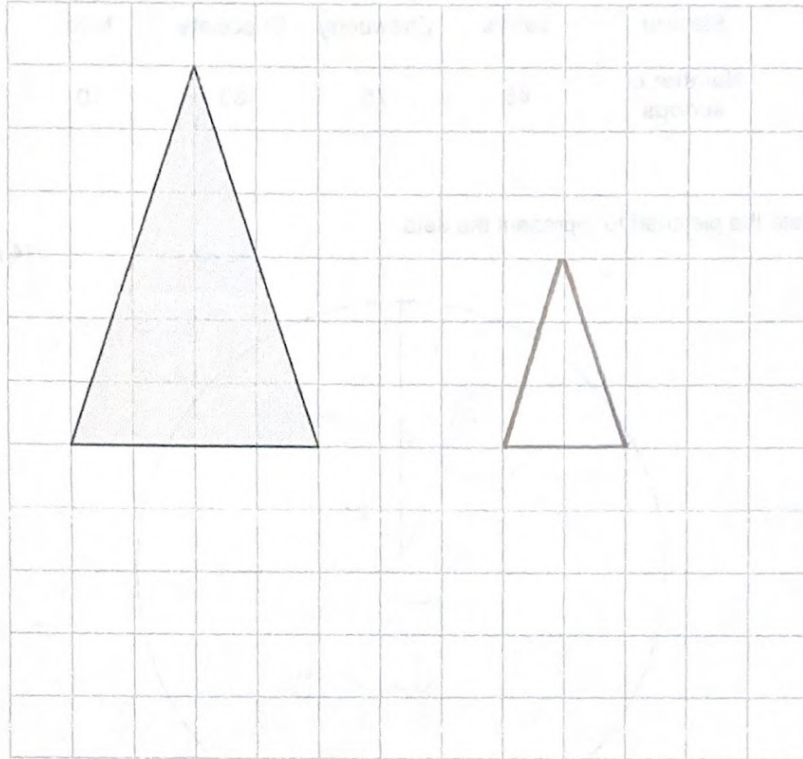


18

On the grid, draw an enlargement of the triangle with scale factor $\frac{1}{2}$

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[2 marks]



Do not write
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box19 (a) Simplify fully $3a^2 + 7a + 3 - a^2 + 8a - 4$

[3 marks]

$$3a^2 - a^2 + 7a + 8a + 3 - 4 = 2a^2 + 15a - 1$$

Answer $2a^2 + 15a - 1$

19 (b) Factorise fully $24y^2 - 20y$

[2 marks]

$$4y(6y - 5)$$

Answer $4y(6y - 5)$

20 Solve $x^2 = 196$

[2 marks]

$$x = \pm \sqrt{196} = \pm 14$$

Answer ± 14

Turn over ►



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21 To the nearest pound, Jon has £9

To the nearest 50p, Ellie has £6.50

Work out the maximum possible total amount of money.

[3 marks]

$$\text{Max for Jon} = \pounds 9.49$$

$$\text{Max for Ellie} = \pounds 6.74$$

$$\pounds 9.49 + \pounds 6.74 = \pounds 16.23$$

Answer £ 16.23

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22 Here is a formula.

$$T = n^2 - \frac{12}{n}$$

22 (a) Work out T when $n = 5$

[1 mark]

$$T = 5^2 - \frac{12}{5} = 22.6$$

Answer 22.6

22 (b) Why is T always positive when n is negative?

[2 marks]

n^2 is always positive

$(-\frac{12}{n})$ is positive if n is negative

so positive + positive = positive.



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23

In one hour a machine can make

600 nuts

or

720 bolts.

At 3 pm the machine starts working.

It makes 900 nuts and then changes to making bolts.

How many bolts will the machine make by 8 pm?

[4 marks]

$$900 \text{ nuts} = 1.5 \text{ hrs}$$

$$\rightarrow 4:30 \text{ pm}$$

$$\rightarrow 3.5 \text{ hrs to } 8 \text{ pm}$$

$$720 \times 3.5 = 2520$$

Answer 2520 bolts



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24 Two solids, J and K, have the same density.

Complete the table.

Include units in your answers.

[3 marks]

	J	K
Mass	48 g	78 g
Volume	8 cm ³	13 cm ³
Density	6 g/cm ³	6 g/cm ³

Turn over for the next question

7

Turn over ►



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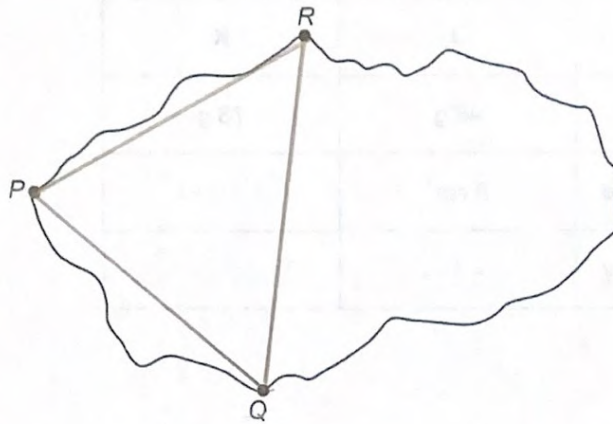
25

Towns P , Q and R are connected by roads PQ , PR and QR .

PR is 10 km longer than PQ .

QR is twice as long as PR .

The total length of the three roads is 170 km



Not drawn
accurately

Work out the length of PQ .

[4 marks]

$$\text{let } PR = x$$

$$PQ = x - 10$$

$$QR = 2x$$

$$x + (x - 10) + 2x = 170$$

$$\Rightarrow 4x - 10 = 170$$

$$\Rightarrow 4x = 180$$

$$PQ = 45 - 10 = 35 \text{ km}$$

$$\Rightarrow x = 45 \text{ km}$$

Answer 35 km



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26 Mia wants to borrow £6000 and repay it, with interest, after two years.
She sees two offers for loans.

Offer 1
Compound interest
3% per year

Offer 2
Compound interest
First year 1%
Second year 5%

Mia says,

"I will pay back the same amount because the average of 1% and 5% is 3%"

Is she correct?

You **must** show your working.

[3 marks]

$$\text{offer 1 : } £6000 \times 1.03^2 = £6365.40$$

$$\text{offer 2 : } £6000 \times 1.01 = £6060$$

$$£6060 \times 1.05 = £6363$$

Therefore Mia is wrong as she will pay back
different amounts.

Turn over for the next question

7

Turn over ►



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27

Here are two sets of numbers, A and B.

Set A

200	160
104	100

Set B

270	400	483
300	x	

mean of Set A : mean of Set B = 3 : 8

Work out the value of x .

[4 marks]

$$\text{mean of set A} = \frac{200 + 160 + 104 + 100}{4} = 141$$

$$(141 \div 3) \times 8 = 376 \text{ (mean of set B)}$$

$$x = (376 \times 5) - 270 - 400 - 483 - 300 = 427$$

Answer 427

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28

A straight line

has gradient 4

and

passes through the point (5, 23)

Work out the equation of the line.

Give your answer in the form $y = mx + c$

[3 marks]

$$y - 23 = 4(x - 5)$$

$$\Rightarrow y = 4x - 20 + 23$$

$$\Rightarrow y = 4x + 3$$

Answer $y = 4x + 3$

Turn over for the next question

7

Turn over ►



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29 Two sides of a triangle have lengths 13 cm and 27 cm
Which of these is a possible length of the other side?
Circle your answer.

[1 mark]

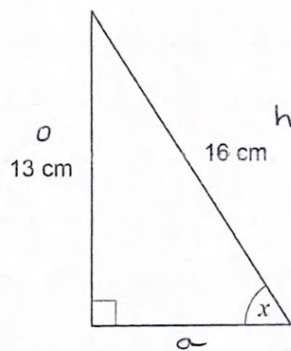
13 cm

14 cm

27 cm

40 cm

30 Here is a right-angled triangle.



Not drawn accurately

Use trigonometry to work out the size of angle x .

[2 marks]

~~cos x =~~ $\sin x = \frac{13}{16}$

$x = \sin^{-1}\left(\frac{13}{16}\right) = 54.3$

Answer 54.3 degrees

END OF QUESTIONS

